

REMARKS

Amendment to Specification

1. Support for the above amendment to the specification can be found on the declaration submitted on March 1, 2002, in response to the Notice to File Missing parts dated December 4, 2001. Further support for the above amendment can be found on the corrected declaration, submitted November 27, 2002. Still further support for the above amendment can be found on the Filing Receipt mailed December 4, 2001, and the Updated Filing Receipt mailed April 17, 2002.

The changes in the specification effected by the amendment are reflected in the attached redlined copy of the amended paragraph.

Election/Restriction

2. The Examiner required restriction in the present application to one of the following groups of claims: claims 1-49 (Group I) or claims 50-53 (Group II). Applicant elects Group I, claims 1-49, with traverse.

Applicant proposes that the prior art search conducted for claims 1-49 (Group I) would significantly overlap the prior art search conducted for claims 50-53 (Group II). Therefore, examination of the entire application, including both Groups I and II together, would not result in a substantially increased burden upon the Examiner. Given that the restriction requirement is discretionary with the Examiner, Applicant respectfully requests that the Examiner reconsider and withdraw the requirement for restriction.

35 U.S.C. § 102

3. The Examiner rejected claims 1-5, 8-10, 13-18, 21-33, 36-42, and 45-49 under 35 U.S.C. § 102(b) as being anticipated by Thorsteinson et al. (U.S. Patent No. 5,187,140).

The present invention provides a solution to the problem of improving the catalytic properties of a certain supported catalyst, in particular silver-containing catalysts with certain promoters (as defined in claim 1). An advantage of the present invention was found in selecting a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes, prior to depositing one or more catalytically reactive metals comprising silver onto the carrier (cf. the present application at page 2, line 29 – page 3, line 2). Evidence for this advantage can be found in the working examples, cf. in particular Table II on page 19 and the explanation offered at page 20 of the present application. The present invention is novel and unobvious in light of the cited prior art.

Each of the claims rejected under 35 U.S.C. § 102(b) involves "a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes." In rejecting the claims under 35 U.S.C. § 102(b), the Examiner asserted in the Office Action of December 18, 2002 that:

Thorsteinson et al. does not specifically disclose that the carrier has a sodium solubilization rate of no greater than 5 ppmw/5 minutes. However, the reference teaches that it is important to remove ions that may affect the performance of the catalyst (column 15, lines 20-30). Further, Thorsteinson et al. teaches a carrier "AJ" which is an alpha alumina carrier which is washed according to the following procedure: 30 minutes in boiling water, 6 times washed at 25 degrees C, each times 1000 cc carrier is washed with 1200 cc water, and dried at 300 degrees C (column 46, lines 5-11). The carrier has 51 ppm of leachable sodium impurities (column 46, lines 14-20). Given the low concentration of leachable sodium, it is considered that the treatment will inherently result in the solubilization rate that is instantly claimed. When the examiner has reason to believe that the functional language asserted to be critical for establishing novelty in claimed subject matter may in fact be an inherent characteristic of the prior art, the burden of proof is shifted to Applicants to prove that the subject matter shown in the prior art does not possess the characteristics relied upon.

Applicant submits that the Examiner has not satisfied the burden of proof required to maintain this rejection under 35 U.S.C. § 102(b). Before considerations of whether any burden of proof should be shifted onto Applicant, the initial burden of establishing a *prima facie* basis to deny patentability to a claimed invention rests upon the Examiner. *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1463-64 (Bd. Pat. App. & Inter. 1990). Furthermore, "[i]n relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic *necessarily* flows from the teachings of the applied prior art." *Id.* at 1464 (emphasis in original). See also *In re Robertson*, 169 F.3d 743, 745, 49 U.S.P.Q.2d 1949, 1950-51 (Fed. Cir. 1999) ("To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill.'"). "The mere fact that a certain thing *may* result from a given set of circumstances is not sufficient [to establish inherency]." *In re Rijckaert*, 9 F.3d 1531, 1534, 28 U.S.P.Q.2d 1955, 1957 (Fed. Cir. 1993) (emphasis in original); see also *In re Robertson*, 169 F.3d at 745, 49 U.S.P.Q.2d at 1951. Inherency may not be established by probabilities or possibilities. *In re Robertson*, 169 F.3d at 745, 49 U.S.P.Q.2d at 1951.

The Examiner's reasoning, quoted above in the block quote, does not reasonably support a determination that "a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes" necessarily flows from the teachings of Thorsteinson et al. Without more, a teaching of ion removal, a washing procedure, and a level of leachable sodium impurities, which the Examiner asserts are present in Thorsteinson et al., provide insufficient basis for any determinations or estimations concerning whether a sodium solubilization rate is no greater than 5 ppmw/5 minutes. At best, the Examiner has proposed a mere possibility of what Thorsteinson et al. may inherently contain. Thus the Examiner has not satisfied the burden of proof required to maintain this rejection under 35 U.S.C. § 102(b) based on a theory of inherent disclosure.

Thorsteinson et al. teaches a process for the epoxidation of alkenes in the presence of a supported silver catalyst which has a high silver content, and the carrier has a high surface area and a high porosity (cf. col. 6, lines 24-33). As regards impurities which may be present in the carrier, Thorsteinson et al. states that, for the sake of repeatability in the use and re-use of impregnation solutions, the carrier should preferably not contain undue amounts of ions which are soluble in the impregnation solution and/or exchange with the promoter supplied to the catalyst, so as to upset the amount of promoter which provides the desired catalyst enhancement. If the carrier contains such ions, the ions should generally be removed, otherwise they must be taken into account during the catalyst preparation (cf. col. 15, lines 21-31). Examples 111-116 relate to catalysts and their use as epoxidation catalysts which catalysts are based merely on silver and cesium deposited on a washed carrier (cf. also col. 46, lines 6-19).

Nowhere does Thorsteinson et al. teach or suggest selecting a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes and subsequently using the carrier for making a catalyst comprising silver and promoters selected from sulfur, phosphorus, boron, fluorine, lithium, sodium, rubidium, Group IIA through Group VIII metals, rare earth metals, and combinations thereof. It is respectfully submitted that Thorsteinson et al. does not anticipate the presently rejected claims.

In addition, all that Thorsteinson et al. teaches about the effects of impurities from the carrier relates to the repeatability when an impregnation solution is used and re-used (cf. col. 15, lines 21-31). In that case, the skilled person is given the option of removing the impurity in some instances or taking into account the presence of the impurity in other instances. This means effectively that Thorsteinson et al. does not teach or suggest any practice of consistently removing impurities for the purpose of improving catalyst performance. Examples 111-116 do not relate to use and re-use of impregnation solutions. No teaching or explanation is provided as to the purpose of washing specifically the carrier of these examples 111-116, whilst in many other examples unwashed carriers were used. There is no hint in Thorsteinson et al. which would necessarily lead the skilled person to the present invention. Therefore, the invention as claimed in the present claims is unobvious, as well as novel, over Thorsteinson et al.

Applicant respectfully requests that the Examiner reconsider and withdraw the present rejections.

35 U.S.C. § 103

4. The Examiner rejected claims 6-7, 19-20, 34-35, and 43-44 under 35 U.S.C. § 103(a) as being unpatentable over Thorsteinson et al. (U.S. Patent No. 5,187,140), as applied to claims 1-5, 8-10, 13-18, 21-33, 36-42, and 45-49 in the aforementioned rejection under 35 U.S.C. § 102(b), in further view of Matusz (U.S. Patent No. 5,739,075).

In making this rejection under 35 U.S.C. § 103, the Examiner relied upon the application of Thorsteinson et al. to claims 1-5, 8-10, 13-18, 21-33, 36-42, and 45-49, as discussed above and quoted in the block quote. However, as also shown above, the Examiner has not satisfied the burden of proof required

to maintain the above-discussed rejections of claims 1-5, 8-10, 13-18, 21-33, 36-42, and 45-49 under 35 U.S.C. § 102(b) over Thorsteinson et al. As a further consequence, reliance upon Thorsteinson et al., as applied above by the Examiner to claims 1-5, 8-10, 13-18, 21-33, 36-42, and 45-49, cannot properly support the present rejections under 35 U.S.C. § 103.

Matusz teaches the preparation of improved supported silver catalysts for the epoxidation of olefins, by pre-doping, pre-treating or pre-impregnating the carrier with a salt of a rare earth metal and a salt of an alkaline earth metal and/or a Group VIII transition metal. Any of a large number of carriers or support materials may be used, for example alpha-alumina (cf. col. 2, lines 12-36; col. 4, lines 10-32; col. 15, lines 42-45).

Each of the presently rejected claims involves "sodium solubilization rates." Matusz, like Thornsteinson et al. (as discussed above), is silent with respect to sodium solubilization rates and any effect which they have on the performance of a catalyst in an epoxidation process. It follows that any combination of Thornsteinson et al. and Matusz could not teach or suggest the sodium solubilization rates involved in the present claims. Thus the present claims are unobvious over Thornsteinson et al. in further view of Matusz.

Applicant respectfully requests that the Examiner reconsider and withdraw the present rejections under 35 U.S.C. § 103(a).

5. The Examiner rejected claims 1-6, 9-19, 22-34, 37-43, and 46-49 under 35 U.S.C. § 103(a) as being unpatentable over Finch et al. (U.S. Patent No. 2,424,083) in view of Notermann et al. (U.S. Patent No. 4,994,587).

Each of these rejected claims involves "a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes." In rejecting these claims, the Examiner asserted in the Office Action of December 18, 2002 that:

Finch et al. does not disclose that the support is treated such that the sodium solubilization rate is no greater than 5 ppmw per 5 minutes.

Notermann et al. (US 4,994,587) discloses a catalytic system for epoxidation of alkenes. The catalyst comprises silver on a solid support (column 11, lines 55-60). The support has less than about 50 and most frequently less than about 20 ppm of leachable sodium (column 11, lines 60-63). A preferred support material is alpha alumina (column 13, lines 1-2).

Notermann et al. teaches that improved results are obtained by using a support wherein the support contains low levels of leachable sodium (column 13, lines 28-35). Notermann et al. teaches that the presence of leachable sodium exhibits deactivating and effective life-shortening effects on the catalytic system (column 11, lines 18-25). The low sodium support can be prepared by any methods suitable for removing sodium from a solid (column 13, lines 40-45). Typically the techniques involve extraction and/or volatilization of the sodium present (column 13, lines 50-68). Prepared supports have BET surface areas of 1.56 m²/g (column 23, Example 1).

Notermann et al. does not specifically disclose that the sodium solubilization rate of the carrier is no greater than 5 ppmw/5 minutes. However, it is considered that because Notermann et al. teaches removing leachable sodium from the carrier material, the resulting material will have the solubilization rate instantly claimed.

The Examiner's rejection is based upon an assertion by the Examiner that Notermann et al. inherently discloses "a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes." However, as discussed previously, to satisfy the Examiner's burden of proof, "the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic *necessarily* flows from the teachings of the applied prior art." *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Inter. 1990); *see also In re Robertson*, 169 F.3d 743, 745, 49 U.S.P.Q.2d 1949, 1950-51 (Fed. Cir. 1999).

The Examiner's reasoning, quoted above in the block quote, does not reasonably support a determination that "a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes" necessarily flows from the teachings of Notermann et al. Without more, a teaching of sodium removal and levels of leachable sodium, which the Examiner asserts are present in Notermann et al., provide insufficient basis for any determinations or estimations concerning whether a sodium solubilization rate is no greater than 5 ppmw/5 minutes. At best, the Examiner has proposed a mere possibility of what Notermann et al. may inherently contain. For example, while the carrier as treated in Example 1 of Notermann et al. by heating with NH₄F may have a relatively low sodium content, the carrier could possibly still have a relatively high sodium solubilization rate when contacted with water. Thus the Examiner has not satisfied the burden of proof required to maintain this rejection based on a theory of inherent disclosure. In addition, nowhere does Notermann et al. teach or suggest selecting a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes and subsequently using the carrier for making a catalyst comprising silver and promoters selected from sulfur, phosphorus, boron, fluorine, lithium, sodium, rubidium, Group IIA through Group VIII metals, rare earth metals, and combinations thereof.

As acknowledged by the Examiner, "Finch et al. does not disclose that the support is treated such that the sodium solubilization rate is no greater than 5 ppmw per minutes" and "Notermann et al. does not specifically disclose that the sodium solubilization rate of the carrier is no greater than 5 ppmw/5 minutes." Because each of the presently rejected claims involves "a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes," any combination of Finch et al. with Notermann et al. could not teach or suggest the present claims. Therefore, the present claims are unobvious over Finch et al. in view of Notermann et al.

While maintaining that the Examiner has not met the burden of reasonably supporting a determination that "a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes" necessarily flows from the teachings of Notermann et al., Applicant further submits that the "low sodium level" teachings of Notermann et al. cannot properly be applied to Finch et al. Notermann et al. states that :

The presence of leachable sodium in a silver catalyst employed for epoxidation tends, in some instances, to improve the efficiency of the system under epoxidation conditions generally used. In the presence of CO₂ and certain efficiency-enhancing compounds, however, sodium exhibits deactivating and effective life-shortening effects on epoxidation catalysts and systems.

(Col. 11, lines 18-24). Notermann et al. further states that “[t]he catalyst and process of the present invention [of Notermann et al.] diminish the deactivating and life-shortening effects of CO₂” (Col. 11, lines 45-47) and that “[t]he catalyst contemplated by the present invention [of Notermann et al.] comprises a catalytically-effective amount of silver on a solid support and an efficiency-enhancing amount of at least one efficiency-enhancing salt of a member of a redox-half reaction pair” (Col. 11, lines 56-61).

These statements taken from Notermann et al. clearly indicate that the “low sodium level” teachings of Notermann et al. are disclosed for the purpose of dealing with specific situations of epoxidation in the presence of certain “efficiency-enhancing salts” and damaging amounts of CO₂. In addition, these statements taken from Notermann et al. further suggest that absent the “efficiency-enhancing salts” and damaging amounts of CO₂, the presence of leachable sodium may actually be beneficial.

Finch et al. makes no mention of “efficiency-enhancing salts” and damaging amounts of CO₂ and thus does not present a situation of epoxidation in the presence of certain “efficiency-enhancing salts” and damaging amounts of CO₂. Therefore, a person of ordinary skill in the art would not be motivated to apply to Finch et al. the “low sodium level” teachings of Notermann et al., which are taught by Notermann et al. as being desirable when certain “efficiency-enhancing salts” and damaging amounts of CO₂ are present. In fact, a person of ordinary skill in the art might be discouraged by Notermann et al. from applying the “low sodium level” teachings of Notermann et al. in the absence of “efficiency-enhancing salts” and damaging amounts of CO₂, given the suggestion by Notermann et al. that the presence of leachable sodium may have benefits.

Because the Examiner has not met the burden of proof necessary to support a theory of inherent disclosure by Notermann et al., and noting that Notermann et al. and Finch et al. cannot be properly combined in the manner proposed by the Examiner, Applicant respectfully requests that the Examiner reconsider and withdraw the present rejections under 35 U.S.C. § 103(a).

6. The Examiner rejected claims 7-8, 20-21, 35-36, and 44-45 under 35 U.S.C. § 103(a) as being unpatentable over Finch et al. in view of Notermann et al. as applied to claims 1-6, 9-19, 22-34, 37-43, and 46-49, discussed above, and further in view of Matusz. In making the present rejection, the Examiner relied upon the modified disclosure of Finch et al., discussed above, as applied to claims 1-6, 9-19, 22-34, 37-43, and 46-49 to support the present rejection.

As shown above, the Examiner has not met the burden of proof necessary to support a theory of inherent disclosure by Notermann et al. Such burden must be satisfied to maintain the rejection of claims 1-6, 9-19, 22-34, 37-43, and 46-49 over Finch et al. in view of Notermann et al. Furthermore, as

shown above, Notermann et al. and Finch et al. cannot be properly combined in the manner proposed by the Examiner in the rejection of claims 1-6, 9-19, 22-34, 37-43, and 46-49 over these references. Thus reliance upon Finch et al. in view of Notermann et al., as applied above by the Examiner to claims 1-6, 9-19, 22-34, 37-43, and 46-49, cannot properly support the present rejections under 35 U.S.C. § 103.

Finally, as discussed previously, Finch et al., Notermann et al., and Matusz are all silent with respect to sodium solubilization rates. Because each of the presently rejected claims involves "a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes," any combination of these cited references could not teach or suggest the present claims. Therefore, the present claims are unobvious over the cited art.

Applicant respectfully requests that the Examiner reconsider and withdraw the present rejections under 35 U.S.C. § 103(a).

Please Note

7. Applicant believes that the Examiner is aware of related applications U.S. Patent Application No. 09/805,317 and U.S. Patent Application No. 09/992,787. Applicant respectfully asks that the Examiner advise if some action by Applicant is necessary for proper consideration of the related applications in this application and for proper consideration in each of the related applications of the other related application and the present application.

Applicant has submitted herewith a petition for a one-month extension of time. Applicant believes that no further extension of time is presently required. However, if Applicant is mistaken, please charge the fees required for additional extensions of time under 37 CFR 1.136(a) to Shell Oil Company, Deposit Account No. 19-1800.

Each of the rejections having been traversed, allowance of the claims of the present application is respectfully requested. If the Examiner would like to discuss this case with Applicant's attorney, the Examiner is invited to contact Richard Lemuth at the below phone number.

Respectfully submitted,
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REDLINED COPY OF AMENDED SPECIFICATION PARAGRAPH
for US 09/992,784
Docket No. TH-1396N

In the Specification:

Please delete the paragraph inserted before the first line of the application as originally filed and in place of the deleted paragraph insert the following paragraph:

This is a continuation of Application Serial No. 09/392,521 filed September 9, 1999, the entire disclosure of which is hereby incorporated by reference. This application claims the benefit of U.S. Provisional Application No. 60/100,196 filed September 14, 1998, the entire disclosure of which is hereby incorporated by reference.